minerals or rocks present in the gemstone, but may also be water, gas or petroleum. These inclusions are likened to the gemstone's personal DNA or fingerprint.

Coloured gemstone certification in some cases provide written descriptions of internal and external features in the gemstone, for example, under a heading of 'Observations'. Some certificates will also plot such features in the form of a diagram and this is included in the certificate issued. Often these descriptions and diagrams are too technical for a lay-person to understand, adding to the uncertainty of whether a particular gemstone has been swapped by a jeweller.

It is an object of the present invention to enhance the certification credibility and accuracy of gemstone verification.

SUMMARY OF THE INVENTION

Broadly, the present invention uses imaging technology to photograph gemstone inclusions and display the inclusion image on a gemstone certificate or document.

In one form, there is provided a method for certifying and verifying gemstones, including the steps of capturing at least one image of an internal inclusion within a gemstone using a first magnification device; ; storing the image in a first database; and displaying the image on a certification document for presenting to a consumer, wherein the image is of sufficient magnification to allow the consumer to compare the image on the document to the gemstone viewed through a second magnification device to verify if the gemstone matches the image.

In a second form, there is provided a system for certifying and verifying gemstones , including: a first magnification device for capturing at least one image of an internal inclusion in a gemstone; a first database for storing the image; and a processor for processing the image for displaying on a certification document for presenting to a consumer, wherein the image is of sufficient magnification to allow the consumer to compare the image on the document to

the gemstone viewed through a second magnification device to verify if the gemstone matches the image.

In a third form, there is provided a document certifying gemstones comprising at least one image of an internal inclusion within a gemstone, using a first magnification device, wherein the image is of sufficient magnification to allow a consumer to compare the image on the document to the gemstone viewed through a second magnification device to verify if the gemstone matches the image.

A software product for carrying out the steps of the method is also provided.

The location of the inclusion may be identified using an x, y, z axis and displayed on the document. This enhances the credibility and accuracy of the certification and verification.

The magnification level may also be displayed on the document. This makes it easier for a consumer verifying the gemstone to set the correct magnification on his/her microscope to accurately view the inclusion. Preferably, the magnification level range is between 10 and 100 times depending on the clarity of the gemstone.

Additional physical identification data may also be displayed on the document for added credibility and accuracy, including one or more of the gemstone's appearance, shape, size, weight, measurements, colour, refractive index, specific gravity and absorption spectrum.

To allow a consumer to access the document in real-time, for example upon purchasing a gemstone or receiving his/her returned gemstone from a jeweller, the document may be stored in a second database (which may comprise one database together with the first database) wherein the second database is accessible by a consumer via a smartphone application or online web application for displaying the stored document on the consumer's smartphone or computer in real-time.

Examples of inclusions which may be imaged in this invention include one or more of solid, liquid or gas inclusions, zones of crystal growth, striation, healed fractures, hollow growth tubes, needle-shaped crystals, twin-planes, internal fissures, cleavages, stress cracks, doubling effect, bubbles, cleavage fault, curved striae, dark ball like inclusions, feather, fingerprint, flash effect, halo inclusions, internal growth patterns, liquid filled or healing feathers, needle or feather inclusions, rain inclusions, swirl marks, three-phase inclusions, tube inclusions, twinning planes, colour zone and two-phase inclusions.

Forms of the present invention allow customers to recognise their own gemstone's DNA (such as its cut, colour, shape, size or measurement, internal inclusions) through visual recognition and specialized high definition microscopic photography. The gemstone's internal and external features are visually captured and crystallized in photographs taken using high definition optical devices. The details and photographs are placed on the gemstone document, making it simple for a customer to look at their gemstone through an optical device such as a microscope and compare to the document to check for any inconsistencies.

The invention therefore provides enhanced accuracy by removing the perennial fear that most owners of gemstones have of the possibility of the gemstone being swapped, exchanged, damaged or reduced in size or quality when sent for cleaning, repair, re-setting or re-designing. Use of simple optical devices such as microscopes makes the process easily accessible and understandable by lay-persons. The invention thereby enhances the certification credibility and accuracy of gemstone verification.

BRIEF DESCRIPTION OF THE FIGURES

An illustrative embodiment of the present invention will now be described with reference to the accompanying figures. Further features and advantages of the invention will also become apparent from the accompanying description:

Figure 1 is a system overview diagram of one embodiment of the system of the invention;

Figure 2 is a flow diagram of one embodiment of the method of the invention;

CLAIMS:

1. A processor-implemented method for certifying and verifying gemstones , including the steps of:

capturing at least three images of a first gemstone, wherein the at least three images include a top view, a side view, and a 10x to 100x magnified internal view of one or more internal inclusions of the first gemstone using a first microscope;

identifying the location of a volume within the first gemstone, wherein the volume includes the one or more internal inclusions within the first gemstone, the volume is defined by an x-y-z axis of the first gemstone, the top view of the first gemstone includes a first grid defining two axes of the x-y-z axis, and the side view of the first gemstone includes a second grid defining one axis of the x-y-z axis;

storing the at least three magnified images and the location of the volume within the first gemstone that includes the one or more internal inclusions in a database;

allocating each of the at least three images to a respective field of an electronic certificate template using the processor to access the database and process the at least three images to generate an electronic certificate, the electronic certificate including the at least three images that are each allocated to the respective field of the electronic certificate template;

displaying the top view with an indication of the corresponding two axes, the side view with an indication of the corresponding one axis, the 10x to 100x magnified internal view of the one or more internal inclusions, and the location of the volume within the first gemstone that includes the one or more internal inclusions within the first gemstone to a consumer;

identifying the location of the volume within the first gemstone that includes the one or more internal inclusions within a second gemstone based on the top view that compares the top view with the indication of the corresponding two axes and the side view with the indication of the corresponding one axis; and

verifying that the first gemstone and the second gemstone are the same in response to the volume within the second gemstone including the one or more

internal inclusions of the first gemstone based on the 10x to 100x magnified internal view of one or more internal inclusions of the first gemstone.

2. The method of claim 1, wherein the stored magnified image and location is displayed to a consumer on one or more of a smartphone or web application and a printed certificate.

3. The method of claim 2, further including displaying the magnification level of the magnified image.

4. The method of claim 3, further including displaying physical identification data of the first gemstone to the consumer, the physical identification data comprising one or more of the first gemstone's appearance, shape, size, weight, measurements, colour, refractive index, specific gravity and absorption spectrum.

5. The method of claim 4, wherein the inclusion includes one or more of solid, liquid or gas inclusions, zones of crystal growth, striation, healed fractures, hollow growth tubes, needle-shaped crystals, twin-planes, internal fissures, cleavages, stress cracks, doubling effect, bubbles, cleavage fault, curved striae, dark ball like inclusions, feather, fingerprint, flash effect, halo inclusions, internal growth patterns, liquid filled or healing feathers, needle or feather inclusions, rain inclusions, swirl marks, three-phase inclusions, tube inclusions, twinning planes, colour zone and two-phase inclusions.

6. A system for certifying and verifying gemstones, including:

a first microscope including a processor and a memory, the memory storing instructions for execution on the processor for:

capturing at least three images of a first gemstone, wherein the at least three images include a top view, a side view, and a 10x to 100x magnified internal view of one or more internal inclusions of a first gemstone, and

identifying the location of a volume within the first gemstone, wherein the volume includes the one or more internal inclusions within the

first gemstone, the volume is defined by an x-y-z axis of the first gemstone, the top view of the first gemstone includes a first grid defining two axes of the x-y-z axis, and the side view of the first gemstone includes a second grid defining one axis of the x-y-z axis;

storing the at least three magnified images and the location of the volume within the first gemstone that includes the one or more internal inclusions in a database;

allocating each of the at least three images to a respective field of an electronic certificate template using the processor to access the database and process the at least three images to generate an electronic certificate, the electronic certificate including the at least three images that are each allocated to the respective field of the electronic certificate template;

displaying the top view with an indication of the corresponding two axes, the side view with an indication of the corresponding one axis, the 10x to 100x magnified internal view of the one or more internal inclusions, and the location of the volume within the first gemstone that includes the one or more internal inclusions within the first gemstone to a consumer;

identifying the location of the volume within the first gemstone that includes the one or more internal inclusions within a second gemstone based on the top view to compare the top view with the indication of the corresponding two axes and the side view with the indication of the corresponding one axis; and

verifying that the first gemstone and the second gemstone are the same in response to the volume within the second gemstone including the one or more internal inclusions of the first gemstone based on the 10x to 100x magnified internal view of one or more internal inclusions of the first gemstone.

7. The system of claim 6, wherein the stored magnified image and location is displayed to a consumer on one or more of a smartphone or web application and a printed certificate.

8. The system of claim 7, further including the processor displaying the magnification level of the magnified image.

9. The system of claim 8, further including the processor displaying physical identification data of the first gemstone to the consumer, the physical identification data comprising one or more of the first gemstone's appearance, shape, size, weight, measurements, colour, refractive index, specific gravity and absorption spectrum.

10. The system of claim 9, wherein the inclusion includes one or more of solid, liquid or gas inclusions, zones of crystal growth, striation, healed fractures, hollow growth tubes, needle-shaped crystals, twin-planes, internal fissures, cleavages, stress cracks, doubling effect, bubbles, cleavage fault, curved striae, dark ball like inclusions, feather, fingerprint, flash effect, halo inclusions, internal growth patterns, liquid filled or healing feathers, needle or feather inclusions, rain inclusions, swirl marks, three-phase inclusions, tube inclusions, twinning planes, colour zone and two-phase inclusions.